

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

Claims 1-60 (cancelled)

61. (previously presented) A method for transfecting a cell with a nucleic acid molecule comprising contacting said cell with a sphingoid-polyalkylamine conjugate together with said nucleic acid molecule, wherein said sphingoid-polyalkylamine conjugate comprises a sphingoid backbone carrying, via a carbamoyl bond, at least one polyalkylamine.

62. (previously presented) The method of Claim 61, wherein said nucleic acid is associated with said sphingoid-polyalkylamine conjugate.

63. (previously presented) The method of Claim 61, wherein said nucleic acid molecule is a plasmid DNA.

64. (previously presented) The method of Claim 61, wherein said nucleic acid molecule is a small interference RNA (siRNA).

65. (previously presented) The method of Claim 61, wherein said nucleic acid molecule is an oligodeoxynucleotide (ODN).

66. (previously presented) The method of Claim 62, wherein said sphingoid-polyalkylamine conjugate forms lipid assemblies.

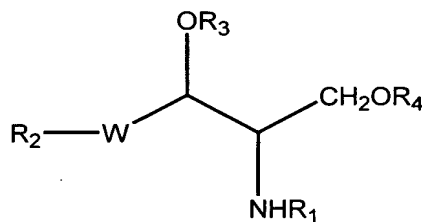
67. (previously presented) The method of Claim 66, wherein said sphingoid-polyalkylamine conjugate forms vesicles, micelles or a mixture of same.

68. (previously presented) The method Claim 61, wherein the sphingoid backbone is selected from ceramide, dihydroceramide, phytoceramide, dihydrophytoceramide, ceramine, dihydroceramine, phytoceramine, dihydrophytoceramine.

69. (previously presented) The method of Claim 61, wherein said sphingoid backbone is a ceramide.

70. (previously presented) The method of Claim 61, wherein said one or more polyalkylamine chains are independently selected from spermine, spermidine, a polyalkylamine analog or a combination thereof.

71. (previously presented) The method of Claim 61, wherein said sphingoid-polyalkylamine conjugate has the following formula (I):



wherein

$\text{R}_1$  represents a hydrogen, a branched or linear alkyl, aryl, alkylamine, or a group  $\text{-C(O)R}_5$ ;

**R<sub>2</sub>** and **R<sub>5</sub>** represent, independently, a branched or linear C<sub>10</sub>-C<sub>24</sub> alkyl, alkenyl or polyenyl groups;

**R<sub>3</sub>** and **R<sub>4</sub>** are independently a group -C(O)-NR<sub>6</sub>R<sub>7</sub>, **R<sub>6</sub>** and **R<sub>7</sub>** being the same or different for **R<sub>3</sub>** and **R<sub>4</sub>** and represent, independently, a hydrogen, or a saturated or unsaturated branched or linear polyalkylamine, wherein one or more amine units in said polyalkylamine may be a quaternary ammonium; or **R<sub>3</sub>** is a hydrogen; or

**R<sub>3</sub>** and **R<sub>4</sub>** form together with the oxygen atoms to which they are bound a heterocyclic ring comprising -C(O)-NR<sub>9</sub>-[R<sub>8</sub>-NR<sub>9</sub>]<sub>m</sub>-C(O)-, **R<sub>8</sub>** represents a saturated or unsaturated C<sub>1</sub>-C<sub>4</sub> alkyl and **R<sub>9</sub>** represents a hydrogen or a polyalkylamine of the formula -[R<sub>8</sub>-NR<sub>9</sub>]<sub>n</sub>-, wherein said **R<sub>9</sub>** or each alkylamine unit R<sub>8</sub>NR<sub>9</sub> may be the same or different in said polyalkylamine; and

**n** and **m**, represent independently an integer from 1 to 10;

**W** represents a group selected from -CH=CH-, -CH<sub>2</sub>-CH(OH)- or -CH<sub>2</sub>-CH<sub>2</sub>-.

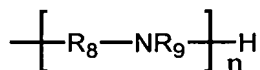
72. (previously presented) The method of Claim 71, wherein **R<sub>1</sub>** represents a -C(O)R<sub>5</sub> group, **R<sub>5</sub>** being as defined.

73. (previously presented) The method of Claim 71, wherein said **R<sub>2</sub>** and **R<sub>5</sub>** represent, independently, a linear or branched C<sub>12</sub>-C<sub>18</sub> alkyl or alkenyl chain.

74. (previously presented) The method of Claim 71, wherein **W** represents -CH=CH-.

75. (previously presented) The method of Claim 71, wherein **R<sub>1</sub>** represents a -C(O)R<sub>5</sub> group; **R<sub>5</sub>** represents a C<sub>12</sub>-C<sub>18</sub> linear or branched alkyl or alkenyl; **W** represents -CH=CH-; **R<sub>2</sub>** represents a C<sub>12</sub>-C<sub>18</sub> linear or branched alkyl or alkenyl; **R<sub>3</sub>** and **R<sub>4</sub>** represent,

independently, a group  $C(O)-NR_6R_7$ , and  $R_3$  may also represent a hydrogen, wherein  $R_6$  and  $R_7$  represent, independently, a hydrogen or a polyalkylamine having the general formula (II):



wherein

$R_8$  represent a  $C_1-C_4$  alkyl;

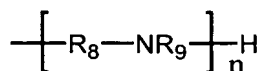
$R_9$  represents a hydrogen or a polyalkylamine branch of formula (II), said  $R_8$  and  $R_9$  may be the same or different for each alkylamine unit,  $-R_8NR_9-$ , in the polyalkylamine of formula (II); and

$n$  represents an integer from 3 to 6.

76. (previously presented) The method of Claim 71, wherein  $R_3$  is a hydrogen atom.

77. (previously presented) The method of Claim 71, wherein both  $R_3$  and  $R_4$  represent the same or different polyalkylamine.

78. (previously presented) The method of Claim 71, wherein  $R_1$  represents a  $-C(O)R_5$  group;  $R_5$  represents a  $C_{12}-C_{18}$  linear or branched alkyl or alkenyl;  $W$  represents  $-CH=CH-$ ;  $R_2$  represents a  $C_{12}-C_{18}$  linear or branched alkyl or alkenyl;  $R_3$  and  $R_4$  represent independently a group  $C(O)-NR_6R_7$ , wherein  $R_6$  and  $R_7$  represent, independently, an alkylamine or a polyalkylamine having the general formula (II):



wherein

$R_8$  represent a  $C_1-C_4$  alkyl;

$R_9$  represents a hydrogen or a polyalkylamine branch of formula (II), said  $R_8$  and  $R_9$  may be the same or different for

each alkylamine unit,  $-R_8NR_9-$ , in the polyalkylamine of formula (II); and

$n$  represents an integer from 3 to 6.

79. (previously presented) The method of Claim 71, wherein  $R_1$  represents a  $C(O)R_5$  group;  $R_5$  represents a  $C_{12}$ - $C_{18}$  linear or branched alkyl or alkenyl;  $W$  represents  $-CH=CH-$ ;  $R_2$  represents a  $C_{12}$ - $C_{18}$  linear or branched alkyl or alkenyl;  $R_3$  and  $R_4$  form together with the oxygen atoms to which they are bonded a heterocyclic ring comprising  $-C(O)-[NH-R_8]_n-NH-C(O)-$ ,

wherein

$R_8$  represents a  $C_1$ - $C_4$  alkyl, wherein for each alkylamine unit  $-NH-R_8-$ , said  $R_8$  may be the same or different; and

$n$  represents an integer from 3 to 6.

80. (previously presented) The method of Claim 71, wherein said  $R_8$  is a  $C_3$ - $C_4$  alkyl.

81. (previously presented) The method of Claim 71, wherein said sphingoid-polyalkylamine conjugate is N-palmitoyl D-erythro sphingosyl-1-carbamoyl spermine (CCS).

82. (previously presented) The method of Claim 61, wherein said sphingoid-polyalkylamine conjugate associated with the nucleic acid molecule is also associated with a targeting substance.

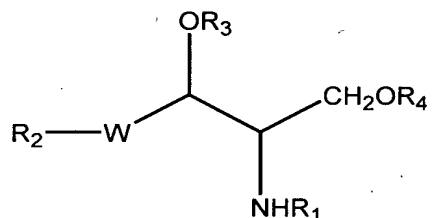
83. (canceled)

84. (previously presented) A method for the treatment of a disease or disorder, the method comprises providing a subject in need of said treatment an amount of a sphingoid-polyalkylamine conjugate associated with a nucleic acid molecule, wherein said

sphingoid-polyalkylamine conjugate comprises a sphingoid backbone carrying, via a carbamoyl bond, at least one polyalkylamine and the amount of said nucleic acid molecule is effective to achieve a desired biochemical effect once in said target cell.

85. (previously presented) The method of Claim 84, wherein said sphingoid backbone is ceramide.

86. (previously presented) The method of Claim 84, wherein said sphingoid-polyalkylamine conjugate has the following formula (I):



wherein

$\text{R}_1$  represents a hydrogen, a branched or linear alkyl, aryl, alkylamine, or a group  $\text{-C(O)R}_5$ ;

$\text{R}_2$  and  $\text{R}_5$  represent, independently, a branched or linear  $\text{C}_{10}\text{-C}_{24}$  alkyl, alkenyl or polyenyl groups;

$\text{R}_3$  and  $\text{R}_4$  are independently a group  $\text{-C(O)-NR}_6\text{R}_7$ ,  $\text{R}_6$  and  $\text{R}_7$  being the same or different for  $\text{R}_3$  and  $\text{R}_4$  and represent, independently, a hydrogen, or a saturated or unsaturated branched or linear polyalkylamine, wherein one or more amine units in said polyalkylamine may be a quaternary ammonium; or  $\text{R}_3$  is a hydrogen; or

$R_3$  and  $R_4$  form together with the oxygen atoms to which they are bound a heterocyclic ring comprising  $-C(O)-NR_9-[R_8-NR_9]_m-C(O)-$ ,  $R_8$  represents a saturated or unsaturated  $C_1-C_4$  alkyl and  $R_9$  represents a hydrogen or a polyalkylamine of the formula  $-[R_8-NR_9]_n-$ , wherein said  $R_9$  or each alkylamine unit  $R_8NR_9$  may be the same or different in said polyalkylamine; and

$n$  and  $m$ , represent independently an integer from 1 to 10;

$W$  represents a group selected from  $-CH=CH-$ ,  $-CH_2-CH(OH)-$  or  $-CH_2-CH_2-$ .

87. (previously presented) The method of Claim 84, wherein said sphingoid-polyalkylamine conjugate is N-palmitoyl D-erythro sphingosyl carbamoyl-spermine (CCS).

88. (previously presented) A transfection composition comprising: a sphingoid-polyalkylamine conjugate comprising a sphingoid backbone carrying, via a carbamoyl bond, at least one polyalkylamine; and a nucleic acid molecule.

89. (previously presented) The transfection composition of Claim 88, comprising a physiologically acceptable carrier.

90. (previously presented) The transfection composition of Claim 88, wherein said nucleic acid molecule has, at a physiological pH, a net negative dipole moment, at least one area carrying a negative charge or a net negative charge.

91. (previously presented) The transfection composition of Claim 88, wherein said nucleic acid molecule is a plasmid DNA.

92. (previously presented) The transfection composition of Claim 88, wherein said nucleic acid molecule is a small interference RNA (siRNA).

93. (previously presented) The transfection composition of Claim 88, wherein said nucleic acid molecule is an oligodeoxynucleotide (ODN).

94. (previously presented) The transfection composition of Claim 88, wherein the sphingoid-polyalkylamine conjugate forms lipid assemblies.

95. (previously presented) The composition of Claim 94, wherein the sphingoid-polyalkylamine conjugate forms vesicles and/or micelles.

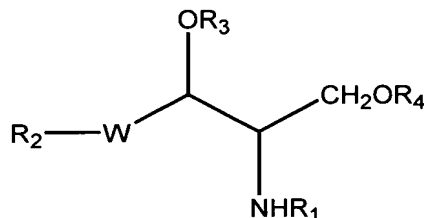
96. (previously presented) The transfection composition of Claim 88, wherein the sphingoid backbone is selected from ceramide, dihydroceramide, phytoceramide, dihydrophytoceramide, ceramine, dihydroceramine, phytoceramine, dihydrophytoceramine.

97. (previously presented) The transfection composition of Claim 94, wherein said sphingoid is a ceramide.

98. (previously presented) The transfection composition of Claim 88, wherein said one or more polyalkylamine chains are independently selected from spermine, spermidine, a polyalkylamine analog or a combination thereof.

99. (previously presented) The transfection composition of Claim 88, wherein said sphingoid-polyalkylamine conjugate has the following formula (I):





wherein

**R**<sub>1</sub> represents a hydrogen, a branched or linear alkyl, aryl, alkylamine, or a group -C(O)**R**<sub>5</sub>;

**R**<sub>2</sub> and **R**<sub>5</sub> represent, independently, a branched or linear C<sub>10</sub>-C<sub>24</sub> alkyl, alkenyl or polyenyl groups;

**R**<sub>3</sub> and **R**<sub>4</sub> are independently a group -C(O)-**NR**<sub>6</sub> **R**<sub>7</sub>, **R**<sub>6</sub> and **R**<sub>7</sub> being the same or different for **R**<sub>3</sub> and **R**<sub>4</sub> and represent, independently, a hydrogen, or a saturated or unsaturated branched or linear polyalkylamine, wherein one or more amine units in said polyalkylamine may be a quaternary ammonium; or **R**<sub>3</sub> is a hydrogen; or

**R**<sub>3</sub> and **R**<sub>4</sub> form together with the oxygen atoms to which they are bound a heterocyclic ring comprising -C(O)-**NR**<sub>9</sub>-[**R**<sub>8</sub>-**NR**<sub>9</sub>]<sub>m</sub>-C(O)-, **R**<sub>8</sub> represents a saturated or unsaturated C<sub>1</sub>-C<sub>4</sub> alkyl and **R**<sub>9</sub> represents a hydrogen or a polyalkylamine of the formula -[**R**<sub>8</sub>-**NR**<sub>9</sub>]<sub>n</sub>-, wherein said **R**<sub>9</sub> or each alkylamine unit **R**<sub>8</sub>**NR**<sub>9</sub> may be the same or different in said polyalkylamine; and

**n** and **m**, represent independently an integer from 1 to 10;

**W** represents a group selected from -CH=CH-, -CH<sub>2</sub>-CH(OH)- or -CH<sub>2</sub>-CH<sub>2</sub>-.

100. (previously presented) The transfection composition of Claim 88, wherein said sphingoid- polyalkylamine conjugate is N-palmitoyl D-erythro sphingosyl carbamoyl-spermine (CCS).

"In re of: BARENHOLZ14

101-106. (canceled)